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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/590,101

07/25/2007

Jung-a Choi

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EXAMINER

WARREN, MATTHEW E

ART UNIT

PAPER NUMBER

2815

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/590,101	<b>Applicant(s)</b> CHOI ET AL.	
	<b>Examiner</b> MATTHEW E. WARREN	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 19-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/17/06</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This Office Action is in response to the Election filed on November 24, 2009.

#### ***Election/Restrictions***

Applicant's election with traverse of Group I claims 1-18 in the reply filed on November 24, 2009 is acknowledged. The traversal is on the ground(s) that examination of the claims will not present a burden to the examiner. This is not found persuasive because the two inventions are classified in two separate subclasses. An examiner who specializes in one subclass would find it difficult to conduct a thorough search of another subclass. A burden is placed on the examiner in such a situation. The requirement is still deemed proper and is therefore made FINAL.

#### ***Claim Objections***

Claim 1 is objected to because of the following informalities: Claim 1 contains a second sentence that states "The semiconductor device of claim 1, wherein the first active region is formed in a line-and-space pattern." It appears that this sentence is a duplication of dependent claim 2 and was not intended to be apart of the claim.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 6- 8, and 10-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Chau et al. (US Pub. 2004/0036126 A1).

In re claim 1, Chau et al. shows (fig. 4B) a semiconductor device comprising: a first active region comprising a plurality of slabs (330) formed on a substrate, each slab having a first surface, a second surface facing a direction opposite to the first surface, and a top surface; a second active region (480) contacting at least one end of each of the slabs on the substrate to connect the slabs to one another; a gate line (324) formed on the first surface, the second surface and the top surface of each of the slabs; and a gate dielectric layer (322) interposed between the slabs and the gate line.

In re claims 2, 4, and 6-8, Chau shows (fig. 4B) the first active region is formed in a line-and-space pattern, the top surface of each of the slabs is disposed a first distance above the substrate, and a top surface of the second active region is disposed a second distance above the substrate, the second distance being equal to or greater than the first distance, the second distance is equal to the first distance, and the second active region contacts both ends of each of the slabs and extends in a direction orthogonal to

a direction in which the slabs extend, the second surface and the top surface of each of the slabs.

In re claims 10 and 11, Chau discloses [0025, 0031] the first active region and the second active region form a source/drain region and the first active region comprises a channel region.

In re claims 12-13, Chau shows (fig. 4B) the gate line extends in a direction orthogonal to the direction in which the slabs extend and wherein the gate line extends parallel to the direction in which the second active region extends.

In re claims 14-15, Chau discloses [0020, 0022] the gate line is composed of conductive polysilicon, metal, metallic nitride, or metal silicide and the gate dielectric layer contains SiO, SiON, SiN, GexOyNz, GexSiyOz, HfO, ZrO, TiO, or TaO.

In re claim 16, Chau discloses [0019] the substrate is a silicon-on-insulator substrate comprising a buried oxide layer and a silicon layer, and the first active region and the second active region are formed on the buried oxide layer.

In re claims 17-18, Chau discloses [0025] a first channel region and a second channel region respectively adjacent to the first surface and the second surface of each of the slabs in the first active region and facing the gate line and a third channel region adjacent to the top surface of each of the slabs in the first active region and facing the gate line.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 5, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chau et al as applied to claim 1 above, and further in view of Buynoski et al. (US 6,716,686).

In re claims 3 and 9, Chau shows all of the elements of the claims except the first and second active regions being different materials. Buynoski et al. shows (figs. 4 and 5) a Finfet device having a first active region (channels 420) and a second active region (S/D regions 230) in which the materials are formed separately and of different materials (col. 3, lines 33-41 and col. 4, lines 34-45). The active region materials are semiconductor materials which include monocrystalline and polycrystalline silicon. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the slabs of Chau by forming the materials of the first and second active regions of different materials because Buynoski teaches that such materials are suitable for the active regions of Fin devices.

In re claim 5, the references do not specifically disclose the second distance of the second active region being greater than the first active region. However, it would have been an obvious matter of design choice to form the second active having any distance or size since such a modification would have involved a mere change in the

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size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. In re Rose, 105 USPQ 237 (CCPA 1955).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hareland et al. (US Pub. 2004/0262692 A1) also disclose a Finfet device having slabs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW E. WARREN whose telephone number is (571)272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew E Warren/  
Primary Examiner, Art Unit 2815